

Having described the invention, the following is claimed:

1. An apparatus for helping to protect an occupant of a vehicle that has a side structure and a roof, said apparatus comprising:

an inflatable curtain that is inflatable away from the vehicle roof to a position adjacent the side structure of the vehicle, said inflatable curtain comprising a front portion and a rear portion;

an inflation fluid source for providing inflation fluid for inflating said inflatable curtain; and

a fill tube for directing inflation fluid from said inflation fluid source into said inflatable curtain, said fill tube having a portion extending into one of said front and rear portions and terminating in said one of said front and rear portions, said fill tube having an open end portion for directing inflation fluid to flow axially from said fill tube into said inflatable curtain and at least one aperture for directing inflation fluid to flow generally radially from said fill tube into said inflatable curtain.

2. The apparatus recited in claim 1, wherein said open end portion directs inflation fluid into the other of said front and rear portions, said at least one aperture directing inflation fluid into said one of said front and rear portions.

3. The apparatus recited in claim 1, wherein said front portion of said inflatable curtain comprises at least one inflatable front chamber inflatable between the side structure and front seating of the vehicle, said rear portion of said inflatable curtain comprising at least one inflatable rear chamber inflatable between the side structure and rear seating of the vehicle.

4. The apparatus recited in claim 3, wherein said portion of said fill tube is positioned in said rear portion of said inflatable curtain, said open end portion directing inflation fluid into said front portion and into said at least one front chamber, said apertures directing said inflation fluid into said rear portion and into said at least one rear chamber.

5. The apparatus recited in claim 4, wherein said fill tube enters said inflatable curtain through a rear edge of said inflatable curtain at a location adjacent an upper edge of said inflatable curtain.

6. The apparatus recited in claim 4, wherein said open end portion of said fill tube is positioned in said rear portion adjacent a C pillar of the vehicle, said fill tube entering said inflatable curtain through a rear edge of said inflatable curtain at a location adjacent an upper edge of said inflatable curtain.

7. The apparatus recited in claim 3, wherein said portion of said fill tube is positioned in said front portion of said inflatable curtain, said open end portion directing inflation fluid into said rear portion and into said at least one rear chamber, said apertures directing said inflation fluid into said front portion and into said at least one front chamber.

8. The apparatus recited in claim 7, wherein said fill tube enters said inflatable curtain through a front

edge of said inflatable curtain at a location adjacent an upper edge of said inflatable curtain.

9. The apparatus recited in claim 1, further comprising a non-inflatable portion disposed between said front and rear portions and a passage providing fluid communication between said front and rear portions, said open end portion of said fill tube directing inflation fluid through said passage into the other of said front and rear portions.

10. The apparatus recited in claim 9, wherein said portion of said fill tube has a length sufficient to position said open end portion near said passage.

11. The apparatus recited in claim 9, wherein said passage extends along an upper edge of said inflatable curtain above said non-inflatable portion.

12. The apparatus recited in claim 11, wherein said fill tube extends into said one of said front and rear portions along an upper edge of said inflatable curtain,

said open end portion directing said inflation fluid along said upper edge into said passage.

13. The apparatus recited in claim 9, wherein said non-inflatable portion helps define said passage.

14. The apparatus recited in claim 1, wherein said portion of said fill tube has a length sufficient to extend along at least 25% of the length of said one of said front and rear portions.

15. The apparatus recited in claim 1, wherein said open end portion of said fill tube directs inflation fluid into said inflatable curtain in a direction generally parallel to a longitudinal axis of said fill tube, said at least one aperture directing inflation fluid into said inflatable curtain in a direction transverse to said longitudinal axis.

16. The apparatus recited in claim 15, wherein said direction transverse to said longitudinal axis is generally vertically downward in the vehicle.

17. The apparatus recited in claim 1, wherein said open end portion and said at least one aperture have flow areas that are proportional to the inflatable volume of the other of said front and rear portions and said one of said front and rear portions, respectively.

18. The apparatus recited in claim 1, wherein said fill tube comprises a metal fill tube, said inflatable curtain having at least one portion clamped to said fill tube.

19. An apparatus for helping to protect an occupant of a vehicle that has a side structure, a roof, front seating, and rear seating, said apparatus comprising:

an inflatable curtain that is inflatable away from the vehicle roof to a position adjacent the side structure of the vehicle, said inflatable curtain comprising at least one inflatable first chamber inflatable between the side structure and one of the front and rear seating, at least one inflatable second chamber inflatable between the side structure and the other of the front and rear seating, a non-inflatable portion positioned between said first and second

chambers, and a passage providing fluid communication between said first and second chambers;

an inflation fluid source for providing inflation fluid for inflating said inflatable curtain; and

a fill tube for directing inflation fluid from said inflation fluid source into said inflatable curtain, said fill tube having a portion extending into said at least one second chamber and terminating in said at least one second chamber, said fill tube having an open end portion opposite said inflation fluid source for directing inflation fluid through said passage into said at least one first chamber, said fill tube including at least one aperture for directing inflation fluid in a generally downward direction into said at least one second chamber.

20. An apparatus for helping to protect an occupant of a vehicle that has a side structure and a roof, said apparatus comprising:

an inflatable curtain that is inflatable away from the vehicle roof to a position adjacent the side structure of the vehicle, said inflatable curtain

comprising at least one inflatable front chamber inflatable between the side structure and a front seated occupant of the vehicle, at least one inflatable rear chamber inflatable between the side structure and a rear seated occupant of the vehicle, a non-inflatable portion positioned between said front and rear chambers, and a passage providing fluid communication between said front and rear chambers;

an inflation fluid source for providing inflation fluid for inflating said inflatable curtain; and

a fill tube for directing inflation fluid from said inflation fluid source into said inflatable curtain, said fill tube extending from said inflation fluid source into said at least one rear chamber and terminating in said at least one rear chamber, said fill tube having an open end portion opposite said inflation fluid source for directing inflation fluid through said passage into said at least one front chamber, said fill tube including at least one aperture for directing inflation fluid in a generally downward direction into said at least one rear chamber.



21. An apparatus for helping to protect an occupant of a vehicle that has a side structure and a roof, said apparatus comprising:

an inflatable curtain that is inflatable away from the vehicle roof to a position adjacent the side structure of the vehicle;

an inflation fluid source for providing inflation fluid for inflating said inflatable curtain; and

a fill tube for directing inflation fluid from said inflation fluid source into said inflatable curtain, said fill tube having an open end portion for directing an axial flow of inflation fluid from the fill tube into the inflatable curtain, said fill tube including at least one aperture for directing a generally radial flow of inflation fluid from the fill tube to help reduce pressure drop in the inflatable curtain induced by the axial flow of inflation fluid from said open end portion.